

What Is Claimed Is:

1. A device, comprising:
  - a database of stored radio frequency identifiers and radio frequency information corresponding thereto; and
- 5 a processor coupled to the database and operating one or more algorithms for generating a display signal as a function of a correspondence between a decoded radio frequency identifier and one of the stored radio frequency identifiers.
2. The device recited in claim 1 wherein the database of stored radio frequency identifiers is accessed as a function of a radio frequency signal and a position signal.
- 10 3. The device recited in claim 1, further comprising a memory device having the database stored therein.
4. The device recited in claim 1 wherein the one or more algorithms operated by processor includes one or more algorithms for generating the decoded radio frequency identifier by decoding a coded radio frequency identifier.
- 15 5. The device recited in claim 4 wherein the coded radio frequency identifier is coded in Morse.
6. The device recited in claim 1 wherein the display signal is one of a signal indicative of a correspondence and a divergence between the decoded radio frequency identifier and the stored radio frequency identifier.
- 20 7. The device recited in claim 6, further comprising a display coupled to the processor and the database, the display structured to display the radio frequency information in response to the display signal.

8. The device recited in claim 7 wherein the display is structured to display the radio frequency information in response to the display signal indicative of a correspondence between the decoded radio frequency identifier and the stored radio frequency identifier.

5 9. The device recited in claim 8 wherein the display is structured to display caution information in response to the display signal indicative of a divergence between the decoded radio frequency identifier and the stored radio frequency identifier.

10. A device, comprising:  
a means for storing radio frequency information as a function of different radio frequency identifiers;  
a means for interrogating the storing means as a function of a predetermined radio frequency to select one of the stored radio frequency identifiers;  
a means for comparing a decoded radio frequency identifier and the selected one of the stored radio frequency identifiers; and  
15 a means for generating a comparison signal as a function of the comparing the decoded radio frequency identifier and the selected one of the stored radio frequency identifiers.

11. The device recited in 10, further comprising means for interrogating the storing means as a function of the predetermined radio frequency to select radio frequency information.

20 12. The device recited in 11 wherein the means for interrogating the storing means as a function of the predetermined radio frequency to select radio frequency information includes means for interrogating the storing means as a function of a position signal to select the radio frequency information.

25 13. The device recited in 11, further comprising means for decoding a coded radio frequency signal identifier to determine the decoded radio frequency identifier.

14. The device recited in 13 wherein the coded radio frequency signal identifier is coded in Morse.

15. The device recited in 11, further comprising means for displaying the selected radio frequency information.

5 16. The device recited in 15 wherein the means for displaying the selected radio frequency information includes means for displaying one of the selected radio frequency information and warning information as a function of the comparison signal.

17. The device recited in 10 wherein the means for interrogating the storing means as a function of a predetermined radio frequency to select one of the stored radio 10 frequency identifiers includes means for interrogating the storing means as a function of a position signal.

18. The device recited in 17, further comprising means for displaying the selected radio frequency information as a function of the comparison signal.

19. A display device, comprising:

15 a display having a first input structured to receive a radio frequency control signal and a second input coupled to receive radio frequency information, the display structured to display one of the radio frequency information and caution information in response to a signal received on a third input;

20 a radio receiver having a first input coupled to receive the radio frequency control signal and a second input coupled to receive a radio frequency signal having an identifier coded in Morse code, the radio receiver outputting the coded identifier;

25 a memory device having a first input coupled to receive the radio frequency control signal and a second input coupled to receive a position signal, the memory device having a circuit for correlating the radio frequency control signal and the position signal with a database of radio frequency identifiers to select and output on a first output one of the radio frequency identifiers and to select and output on a second

output coupled to the second input of the display radio frequency information corresponding to the selected one of the radio frequency identifiers; and

5 a processor having a first input coupled to receive the output of the radio receiver to receive the coded identifier and a second input coupled to the output of the memory device to receive the selected one of the radio frequency identifiers, the processor operating one or more algorithms for decoding the coded identifier, for comparing the decoded identifier with the selected one of the radio frequency identifiers, and for generating a signal on an output coupled to the third input of the display as a function of the comparing.

10 20. The device recited in 19 wherein the signal generated by the processor as a function of the comparing the decoded identifier with the selected one of the radio frequency identifiers is one of a signal indicative of a correspondence and a divergence between the decoded identifier and the selected one of the radio frequency identifiers.

15 21. The device recited in 20 wherein the signal indicative of a divergence between the decoded identifier and the selected one of the radio frequency identifiers is one of a signal indicative of no identifier being decoded and a decoded identifier that does not correspond to the selected one of the radio frequency identifiers.

20 22. The device recited in 20 wherein the display is structured to display the radio frequency information corresponding to the selected one of the radio frequency identifiers in response to the signal indicative of a correspondence between the decoded identifier and the selected one of the radio frequency identifiers.

25 23. The device recited in 20 wherein the display is structured to display caution information in response to the signal indicative of a divergence between the decoded identifier and the selected one of the radio frequency identifiers.

24. The device recited in 19, further comprising a radio frequency input device coupled to the first input of the display for inputting the radio frequency control signal.

25. A method for displaying a radio frequency identifier, comprising:  
receiving a radio frequency control signal indicating a radio frequency;  
receiving a radio frequency signal corresponding to the indicated radio  
frequency;

5       locating in an onboard database database information corresponding to a facility  
closest to a present position of an aircraft using the indicated radio frequency;  
locating in the onboard database database information corresponding to the  
closest facility;  
determining a correspondence between the database information and the  
10 received radio frequency signal; and  
generating a signal as a function of the correspondence between the database  
information and the received radio frequency signal.

26. The method recited in claim 25, further comprising displaying the located  
database information.

15 27. The method recited in claim 26, further comprising altering the displayed  
database information in response to the generated signal.

28. The method recited in claim 27 wherein altering the displayed database  
information includes altering one or more of a color and a text of the displayed database  
information.

20 29. The method recited in claim 25, further comprising entering the radio frequency  
control signal.

30. The method recited in claim 25 wherein:  
the received radio frequency signal is a coded signal; and  
further comprising decoding the coded signal.

31. A method for controlling the display of information, comprising:  
receiving a decoded coded signal from a radio navigation station;  
correlating the decoded signal to a known radio navigation station;  
retrieving information corresponding to the known radio navigation station from  
5 a database of stored information; and  
making the retrieved information available on an output from the database.

32. The method recited in claim 31 wherein correlating the decoded signal to a  
known radio navigation station includes correlating the decoded signal as a function of a  
current position signal.

10 33. The method recited in claim 31, further comprising displaying the retrieved  
information.

34. The method recited in claim 33, further comprising altering the displayed  
information as a function of the correlating the decoded signal to a known radio  
navigation station.

15 35. The method recited in claim 34 wherein the altering the displayed information as  
a function of the correlating the decoded signal to a known radio navigation station  
includes altering the displayed information to indicate one of a positive correlation and  
a negative correlation.

36. The method recited in claim 35 wherein displaying the retrieved information  
20 includes displaying the retrieved information on a color display.

37. The method recited in claim 31 further comprising decoding the coded signal.

38. The method recited in claim 37 wherein the coded signal is coded in Morse.

39. A method controlling the display of information, comprising:  
    storing radio frequency information as a function of different radio frequency  
    identifiers;  
    interrogating the stored radio frequency information as a function of a  
5 predetermined radio frequency to select one of the stored radio frequency identifiers;  
    comparing a decoded radio frequency identifier and the selected one of the  
    stored radio frequency identifiers; and  
    generating a comparison signal as a function of the comparing the decoded radio  
    frequency identifier and the selected one of the stored radio frequency identifiers.

10 40. The method recited in 39, further comprising interrogating the stored radio  
    frequency information as a function of the predetermined radio frequency to select radio  
    frequency information.

41. The method recited in 40 wherein interrogating the stored radio frequency  
    information as a function of the predetermined radio frequency to select radio frequency  
15 information includes interrogating the stored radio frequency information as a function  
    of a position signal to select the radio frequency information.

42. The method recited in 40, further comprising decoding a coded radio frequency  
    signal identifier to determine the decoded radio frequency identifier.

43. The method recited in 42 wherein the coded radio frequency signal identifier is  
20 coded in Morse.

44. The method recited in 40, further comprising displaying the selected radio  
    frequency information.

45. The method recited in 44 wherein displaying the selected radio frequency  
    information includes displaying one of the selected radio frequency information and  
25 warning information as a function of the comparison signal.

46. The method recited in 39 wherein interrogating the stored radio frequency information as a function of a predetermined radio frequency to select one of the stored radio frequency identifiers includes interrogating the stored radio frequency information as a function of a position signal.

5 47. The method recited in 46, further comprising displaying the selected radio frequency information as a function of the comparison signal.

48. A Morse radio frequency signal identifier decoder, comprising:  
a down-sampler quadrature filter bank coupled to receive a detected Morse radio frequency signal having a coded identifier and structured to convert a received signal  
10 into an in-phase signal and a quadrature-phase signal and reduce the sampling frequency to a predetermined level;  
a pair of down-sampler/multi-stage modulated filter banks coupled to the down-sampler quadrature filter bank and structured to filter respective in-phase and quadrature signals into a predetermined plurality of filter components and to further  
15 reduce the sampling frequency;  
a confidence presence detector coupled to the pair of down-sampler/multi-stage modulated filter banks and structured to search across the plurality of filter components to predict which of the filter banks contains an identification string of a detected radio signal;  
20 a viterbi most-likely sequence estimator coupled to the presence detector and structured to operate a most-likely sequence estimator on outputs of the presence detector; and  
a Morse symbol decoder coupled to the viterbi most-likely sequence estimator and structured to convert a series of 1's and 0's into an estimate of dot, dash,  
25 space and word locations in a detected signal.

49. The decoder recited in claim 48 wherein the detected signal received in the down-sampler quadrature filter bank is an analog radio frequency signal converted to a digital signal.

50. The decoder recited in claim 48, further comprising an analog-to-digital signal converter structured to convert the detected Morse radio frequency signal from an analog signal to a digital signal.

51. The decoder recited in claim 48, further comprising:  
5 a correlator circuit receiving an output of the Morse symbol decoder and a predicted Morse code radio frequency identifier, the correlator circuit structured to correlate the output of the Morse symbol decoder with the predicted Morse code radio frequency identifier to determine whether the detected VHF radio frequency signal identifier corresponds to the predicted identifier.

10 52. The decoder recited in claim 51 wherein the predicted Morse code radio frequency identifier is derived from a database of stored radio frequency identifiers.

53. The decoder recited in claim 51, further comprising a threshold estimator circuit coupled to receive the predicted Morse code radio frequency identifier and structured to estimate a signal energy in the predicted Morse code radio frequency identifier.

15 54. The decoder recited in claim 51, further comprising a comparator coupled to receive the respective outputs of the correlator circuit and the threshold estimator circuit and structured to determine the signal energy in a detected Morse radio frequency signal identifier relative to the threshold estimate of the signal energy in the predicted Morse code radio frequency identifier.

20 55. The decoder recited in claim 54, further comprising a circuit structured to generate a display signal as a function of a determination of the signal energy in the detected Morse radio frequency signal identifier relative to the threshold estimate of the signal energy in the predicted Morse code radio frequency identifier.

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56. The decoder recited in claim 55 wherein the display signal is a signal that identifies one of the detected Morse radio frequency signal identifier corresponding to the predicted Morse code radio frequency identifier, and the detected Morse radio frequency signal identifier diverging from the predicted Morse code radio frequency identifier.

57. The decoder recited in claim 56 wherein the display signal that identifies that the detected Morse radio frequency signal identifier diverging from the predicted Morse code radio frequency identifier further identifies one of that a Morse radio frequency signal identifier was not detected, and that the detected Morse radio frequency signal identifier does not correspond to the predicted Morse code radio frequency identifier.

58. The decoder recited in claim 48 wherein the viterbi most-likely sequence estimator is further structured to operate a most-likely sequence estimator on outputs of the presence detector as a function of a predetermined state chart.

59. A Morse radio frequency signal identifier decoder, comprising:

15 a means for converting a detected Morse radio frequency signal having a coded identifier into an in-phase signal and a quadrature-phase signal and reducing the sampling frequency to a predetermined level;

a means for filtering the respective in-phase and quadrature signals into a predetermined plurality of filter components and to further reducing the sampling frequency.

a means for searching across the plurality of filter components to predict which of the filter banks contains an identification string of a detected radio signal;

a means for operating a most-likely sequence estimator on outputs of the searching means; and

25 a means for converting a series of 1's and 0's into an estimate of dot, dash, space  
and word locations in a detected signal.

60. The decoder recited in claim 59, further comprising a means for converting a detected analog Morse radio frequency signal having a coded identifier into a digital signal and outputting the digital signal to the means for converting the signal into an in-phase signal and a quadrature-phase signal and reducing the sampling frequency to a 5 predetermined level.

61. The decoder recited in claim 59, further comprising a means for correlating an output of the estimate of dot, dash, space and word locations in a detected signal with a predicted Morse code radio frequency identifier and determining whether the identifier of a detected Morse radio frequency signal corresponds to the predicted identifier.

10 62. The decoder recited in claim 61, further comprising a means for deriving the predicted Morse code radio frequency identifier from a database of stored radio frequency identifiers.

63. The decoder recited in claim 61, further comprising a means for estimating a signal energy in the predicted Morse code radio frequency identifier.

15 64. The decoder recited in claim 61, further comprising a means for determining the signal energy in a detected Morse radio frequency signal identifier relative to the threshold estimate of the signal energy in the predicted Morse code radio frequency identifier.

65. The decoder recited in claim 64, further comprising a means for generating a 20 display signal as a function of a determination of the signal energy in the detected Morse radio frequency signal identifier relative to the threshold estimate of the signal energy in the predicted Morse code radio frequency identifier.

66. A method for decoding an identification string in a Morse coded radio frequency signal, the method comprising:

    converting a detected Morse coded radio frequency signal having an identification string into an in-phase signal and a quadrature-phase signal and reducing the sampling frequency to a predetermined level;

    filtering the respective in-phase and quadrature signals into a predetermined plurality of filter components and to further reducing the sampling frequency;

    searching across the plurality of filter components and predicting which of the filter banks contains an identification string of a detected radio signal;

10     operating a most-likely sequence estimator on outputs generated by the searching across the plurality of filter components and predicting which of the filter banks contains an identification string of a detected radio signal; and

    converting a series of 1's and 0's into an estimate of dot, dash, space and word locations in a detected signal.

15 67. The method recited in claim 66, further comprising converting at least an identification string in a detected analog Morse coded radio frequency signal into a digital signal prior to converting the detected radio frequency signal into an in-phase signal and a quadrature-phase signal and reducing the sampling frequency to a predetermined level.

20 68. The method recited in claim 66, further comprising correlating the estimate of dot, dash, space and word locations in an identification string of a detected signal with a predicted Morse code radio frequency identification string and determining whether the identification string of a detected signal corresponds to the predicted identification string.

25 69. The method recited in claim 68, further comprising deriving the predicted identification string from a database of stored identification strings.

70. The method recited in claim 68, further comprising estimating a signal energy in the predicted identification string.

71. The method recited in claim 68, further comprising a means for determining the signal energy in a detected identification string relative to the threshold estimate of the  
5 signal energy in the predicted identification string.

72. The method recited in claim 71, further comprising generating a display signal as a function of the determining the signal energy in the detected identification string relative to the threshold estimate of the signal energy in the predicted identification string.